

ABSTRACT OF THE DISCLOSURE

A hybrid rocket motor is provided with a precombustion chamber supplied with propellant from separate fuel and oxidizer sources. The propellant can be in the form of gas or liquid and injected substantially tangentially into the head end of the hybrid motor adjacent the oxidizer injector to form a propellant swirl. As the hybrid motor oxidizer is injected into the swirl, it is heated and gasified, and assumes a swirling motion which increases the oxidizer path length and thereby increases the dwell time of the oxidizer. The increased dwell time increases combustion efficiency and permits multiple restarts of the hybrid motor. The propellant may also be a combination of solid and fluid reactants. In one embodiment, the oxidizer injector is extended into the combustion chamber to form a toroidal precombustion chamber which has an annular nozzle adjacent a face of the oxidizer injector.